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TITLE: WetNet: Using SSM/I Data Interactively for Global Distribution of Rainfall and Precipitable Water

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SIGNIFICANT ACCOMPLISHMENTS: N/A (Start date was April 15, 1991)

FOCUS OF CURRENT RESEARCH AND PLANS FOR COMING YEAR:

1. Complete hardware installation, prepare for comparative studies of SSM/I, radar, and lightning data. We believe that this will prove to be a powerful combination for evaluating the global distribution of tropical rainfall, and the vertical distribution of latent heating, with strong application to algorithms for use on TRMM, EOS-A, and future GOES spacecraft.

2. Survey potential data bases, identify about five case studies with surface rainfall, radar, lightning, and sounding data. Use SSM/I algorithms (initially at 85 GHz) to identify convective regions of MCSs. It is possible that exensive areas of very cold cloud tops in the GOES IR, often assumed to represent very deep and vigorous convection, may actually correlate better with active stratiform precipitation regions. It is important to know whether the convective and stratiform areas are well separated in space. We will evaluate several approaches to discriminate heavy convective precipitation from lighter stratiform precipitation, including but not limited to those of Adler and Spencer, whose algorithms are well suited to such real data comparisons. There is good reason to expect that the frequency of lightning in MCSs is closely related to the intensity of deep convection, and a good discriminator of the latent heating profile. We will develop a data base of lightning ground strike locations and frequency to begin adding this component to our research.

3. We will develop a catalog of the global distribution of heavy tropical rainfall, and how these zones are organized within larger tropical weather systems. Specifically, we will note the locations of apparent squall line structures. This would be an example of a first use of WetNet in extending knowledge of the distribution of mesoscale systems over the globe alone.

4. Beginning with the first few months of SSM/I data distributed over WetNet we will compare SSM/I radiances with TOVS radiances (moisture and thermal) and OLR observations. The purpose is to improve understanding of how real-world water vapor profiles in the tropical atmosphere are perceived by SSM/I precipitable water algorithm and, at the same time, by the TOVS water vapor channel. The PW algorithms can be used to deduce synoptic scale ascent and descent regions, and provide a context for the above studies, which are intended to discover the type of MCS and the precipitation distribution.